

# 1969

**OPERATING  
SUMMARY**

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## ***FERGUS***

***water pollution  
control plant***

TD227  
F47  
W38  
1969  
MOE

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WATER  
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ONTARIO WATER RESOURCES COMMISSION

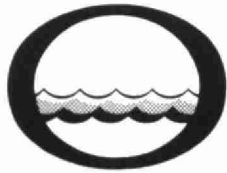
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*Water management in Ontario*


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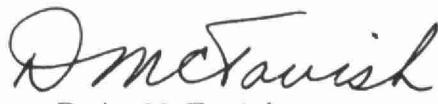
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The operating efficiency and financial status of the water pollution control facilities operated for you in 1969 are presented in the following pages.

The regional operations engineer's comments and the statistical data will assist you in gauging the plant's level of performance. A new flow chart and up-to-date design data are also provided.

Various divisions and sections within the Commission have co-operated in providing what we trust is an accurate and concise annual operating summary.

  
D.S. Caverly,  
General Manager.

  
D.A. McTavish, P. Eng.,  
Director,  
Division of Plant Operations.

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**FERGUS**  
**water pollution control plant**

operated for  
**THE TOWN OF FERGUS**  
by the  
**ONTARIO WATER RESOURCES COMMISSION**

**1969 ANNUAL OPERATING SUMMARY**

## DESIGN DATA

PROJECT NO.	2-0023-58	TREATMENT	Activated Sludge
DESIGN FLOW	0.6 mgd	DESIGN POPULATION	4,700
BOD - Raw Sewage	200 mg/l	SS - Raw Sewage	200 mg/l
- Removal	90%	- Removal	90%

### PRIMARY TREATMENT

#### Grit Removal

Type: Dorr-Oliver, Type T  
Detritor

#### Comminution

Type: Barminutor  
Size: Model B (18")

#### Primary Sedimentation

Type: Dorr-Oliver  
Size: One 40' x 40' x 9' swd  
(90,000 gal)  
Retention: 3.6 hours  
Loading: Surface, 267 gal/ft<sup>2</sup>/day  
Weir, 2,670 gal/ft/day

### SECONDARY TREATMENT

#### Aeration Tank

Type: Mechanical, single pass  
Size: One 72' x 24' x 10' 7" swd  
(22,000 cu ft or 137,500 gal)  
Retention: 5.5 hours

#### Aerators

- Three Ames Crosta driven by a single motor

### Secondary Sedimentation

Type: Dorr-Oliver  
Size: One 35' x 35' x 9' swd  
(11,000 cu ft or 68,500 gal)  
Retention: 2.74 hours  
Loading: Surface, 490 gal/ft<sup>2</sup>/day  
Weir, 4,280 gal/ft/day

### CHLORINATION

Type: BIF Model EVS  
Size: 200 lb/day

#### Chlorine Contact Chamber

Size: 13½' (avg) x 12' x 6' deep  
(911 cu ft or 5,670 gal)  
Retention: 15 min

### OUTFALL

- to Grand River

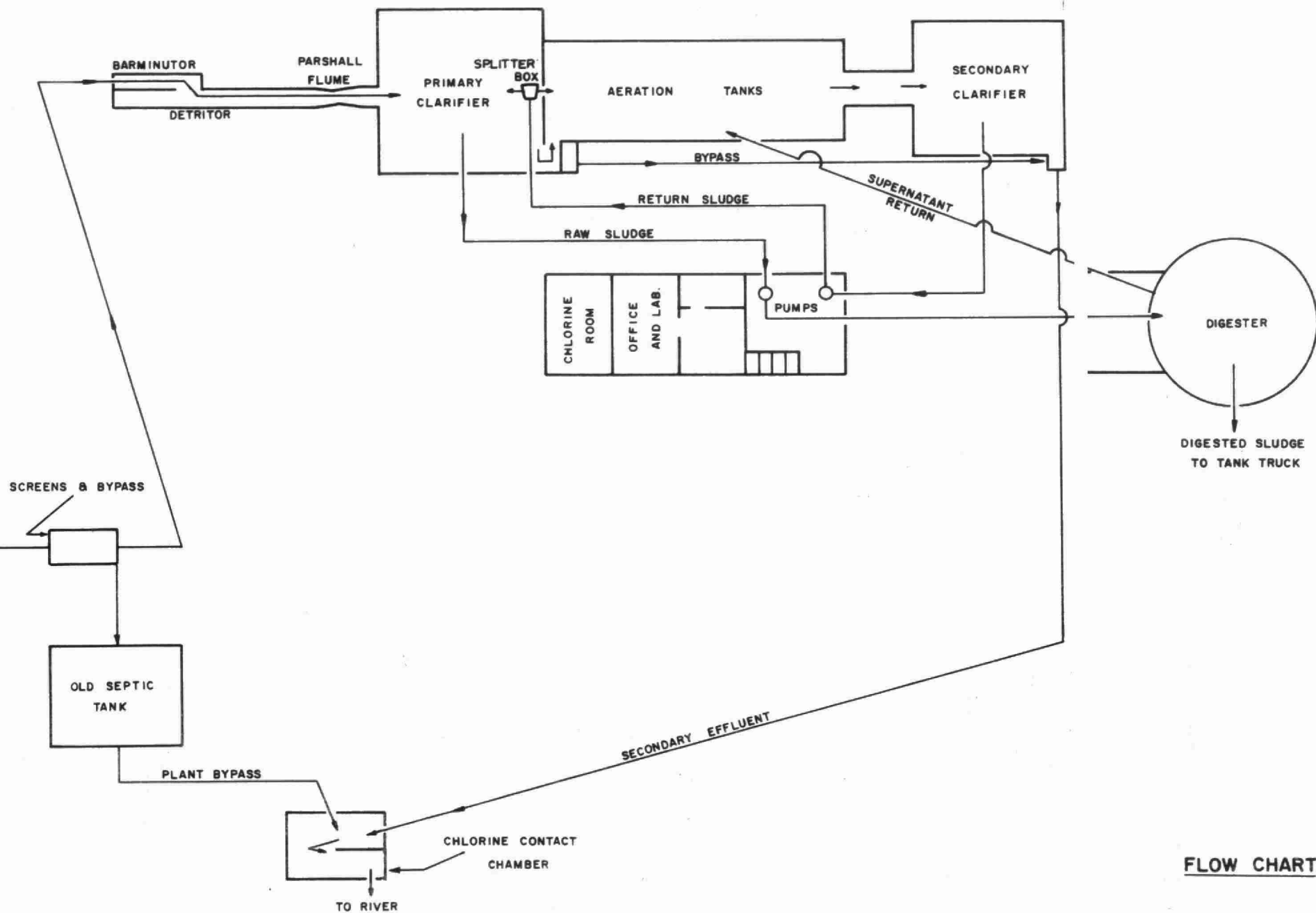
### SLUDGE HANDLING

#### Digestion System

Type: Single stage, with floating cover  
and one Dorr draft tube mixer  
Size: 35' dia x 22' swd (22,700 cu ft or  
141,000 gal)  
Loading: 1.40 lb/ft<sup>3</sup>/mo

#### Drying Beds

- total area, 7,200 sq ft  
(discontinued use in 1964)





# '69 REVIEW

## GENERAL

During 1969 a total flow of 235 million gallons was treated at a cost of \$25,448.57 or \$108.11 a million gallons, compared with \$96.60 a million gallons in 1968. The total flow in 1969 of 235 million gallons was an increase of 3.9 percent from 1968. The cost for each pound of BOD removed was ten cents.

The average daily flow of 0.60 million gallons was equal to the design capacity of the plant. This design flow was exceeded 40% of the time during the year. The BOD and suspended solids reductions of 87% and 89% compared with 94% for each in 1968.

Expansion of the plant should begin in 1970.

During the year, both the Elora and Fergus Water Pollution Control plants were operated by plant staff stationed at Fergus. Under the supervision of head office engineers, the staff operated a clean, attractive and efficient plant for the Town of Fergus.

## PLANT FLOWS and EFFICIENCY

The average daily flow 0.60 mg equalled the design capacity of the plant, and was slightly less than the 1968 average of 0.62 mgd. This decrease can be attributed to the Town's program of providing separate sewers. The design daily flow was exceeded 40% of the time. In 1968, this flow was exceeded 52% of the time.

The raw sewage BOD loading averaged 127 milligrams per litre, but exceeded the design loading of 200 mg/l 15% of the time. Raw sewage suspended solids averaged 208 mg/l, and exceeded the design loading of 200 mg/l 52% of the time.

The average final effluent BOD and suspended solids concentrations of 17 mg/l and 23 mg/l were slightly above the OWRC objectives of 15 mg/l for each. This objective was exceeded 35% of the time for BOD and 63% of the time for suspended solids.

The BOD concentration averaged less than design values, while the suspended solids concentration averaged slightly above this value. The percent reduction of 87 for BOD and 89 for suspended solids is in the normal range for activated sludge plants.

Despite the increase in flows, less grit was removed than in the two previous years. An average chlorine dosage rate of 3.9 mg/l was enough to maintain an average chlorine residual of 0.5 mg/l.

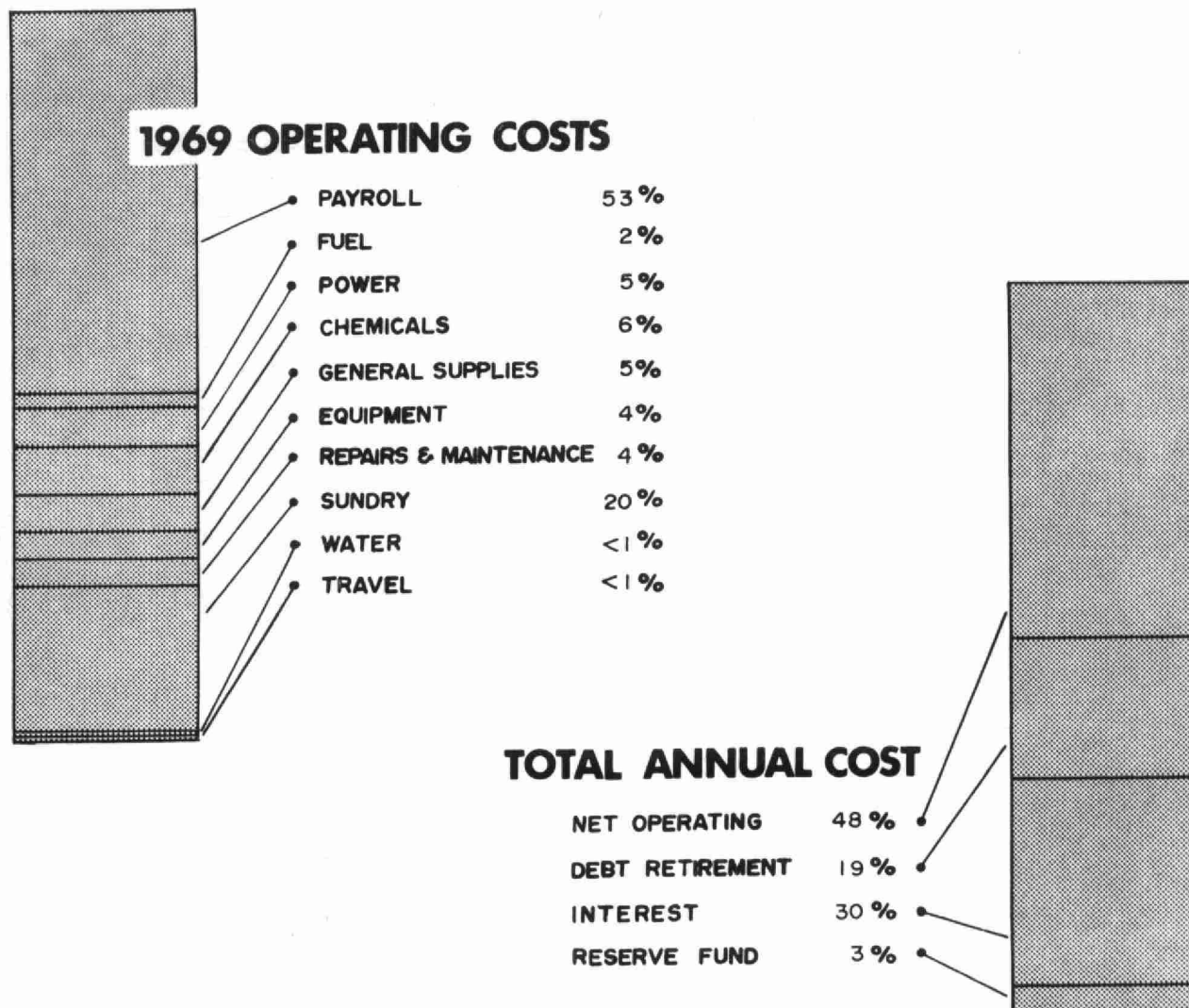
A total of 4,875 cubic yards of sludge was hauled away, of which 2,730 cubic yards was raw. Raw sludge was hauled from June till December 1969 because of repairs to the digester roofing and gas piping. The raw sludge concentration of 6.3% total solids is a normal figure for this type of operation.

## PROJECT COSTS

NET CAPITAL COST (Final) Long Term Debt to OWRC	\$277,393.48
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1969	\$118,072.10
Net Operating	\$ 25,448.57
Debt Retirement	10,064.00
Reserve	1,680.45
Interest Charged	<u>15,529.84</u>
TOTAL	\$ <u>52,722.86</u>

### RESERVE ACCOUNT

Balance @ January 1, 1969	\$ 9,653.14
Deposited by Municipality	1,680.45
Interest Earned	<u>572.55</u>
	\$ 11,906.14
Less Expenditures	<u>889.00</u>
Balance @ December 31, 1969	\$ <u>10,017.14</u>



### Yearly Operating Costs

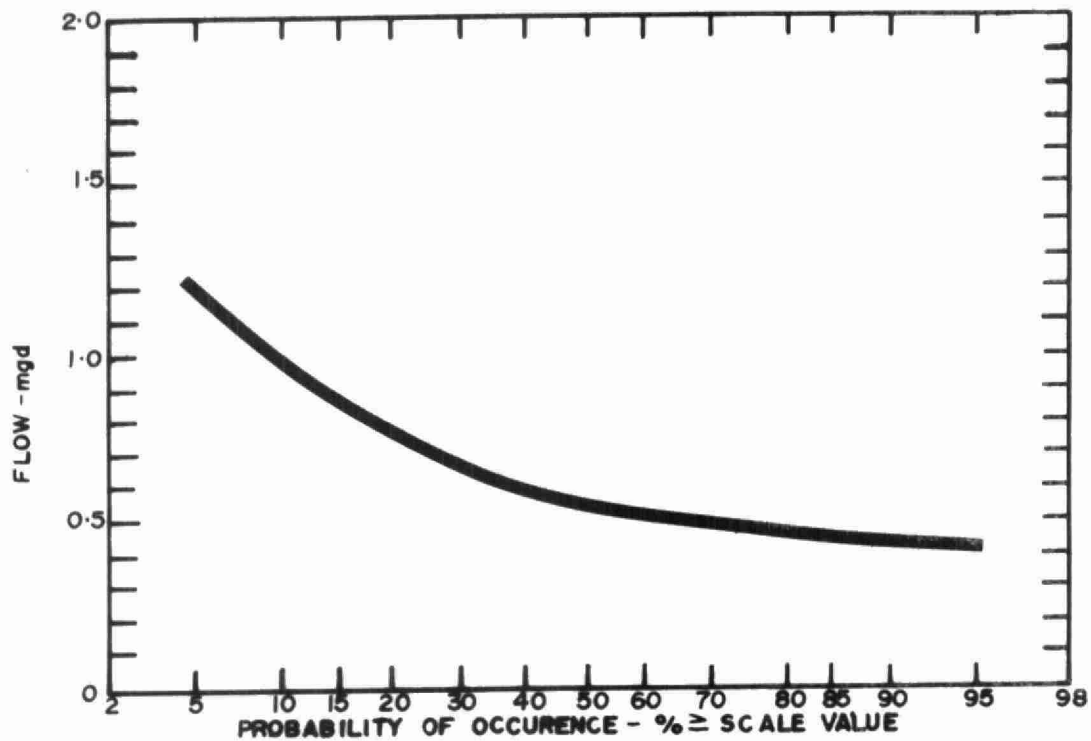
YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1965	208.34	\$21,760.15	\$104.45	3 cents
1966	219.05	20,582.17	93.96	4 cents
1967	258.03	20,388.07	79.01	6 cents
1968	229.31	22,150.62	96.60	6 cents
1969	235.40	25,448.57	108.11	10 cents

## Monthly Operating Costs

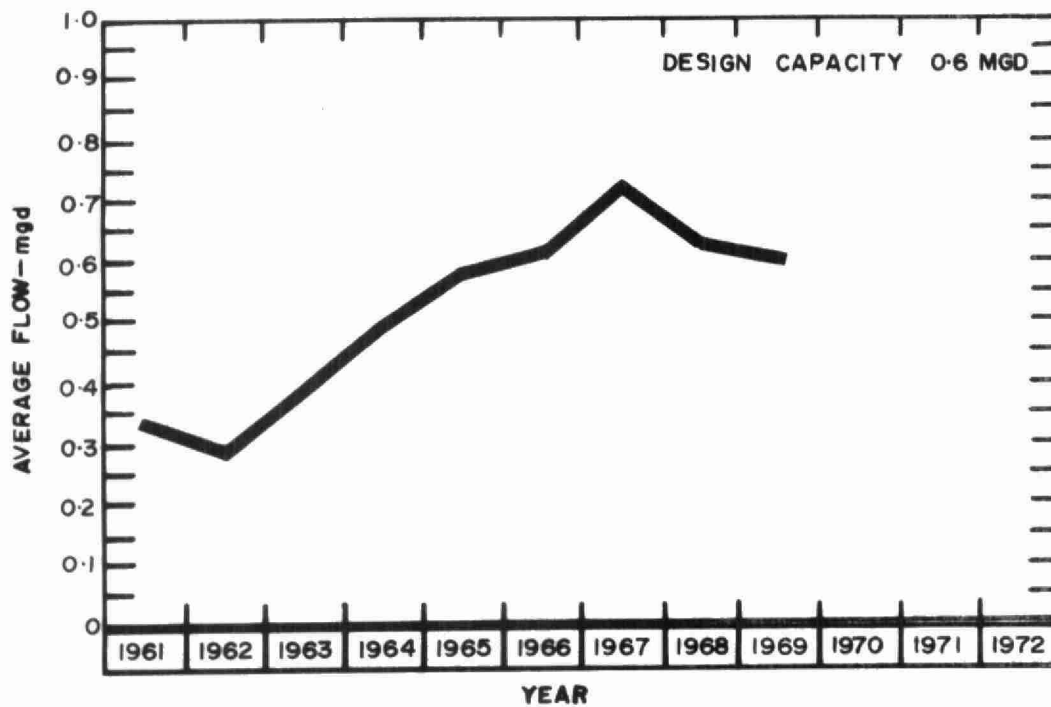
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY *	WATER	TRAVEL
JAN	2121.64	1954.07	-	-	122.76	-	21.06	-	-	15.65	8.10	-
FEB	1928.79	685.69	-	196.98	118.31	238.61	37.06	347.20	-	99.99	-	4.95
MAR	1480.19	937.03	-	-	126.04	95.76	64.38	-	-	51.73	-	5.25
APR	2119.30	1267.54	-	104.30	124.83	-	105.57	-	119.89	83.07	8.10	6.00
MAY	2327.08	767.70	-	101.17	117.13	220.50	40.46	160.70	49.00	64.57	-	5.85
JUNE	1948.52	1094.55	-	-	118.31	-	72.61	-	-	56.90	-	6.15
JULY	2183.60	1061.34	312.74	-	111.33	220.50	88.52	-	19.45	55.77	8.10	5.85
AUG	3090.13	1675.89	468.96	-	116.58	110.25	166.71	-	119.53	21.11	-	11.10
SEPT	1745.89	530.66	30.95	-	111.33	110.25	142.66	324.10	54.00	28.29	-	13.65
OCT	2630.21	921.10	-	-	106.08	220.50	237.61	29.98	648.88	43.86	8.10	23.10
NOV	1272.69	927.42	-	-	121.83	-	17.64	79.24	-	64.26	-	62.30
DEC	2600.53	938.83	-	107.41	100.83	220.50	163.60	-	125.96	37.70	-	5.70
TOTAL	25448.57	12761.82	812.65	509.86	1395.36	1436.87	1157.88	941.22	1136.71	113.90	32.40	149.90

\* SUNDRY INCLUDES SLUDGE HAULAGE COSTS WHICH WERE \$4516.60

**PROCESS DATA**

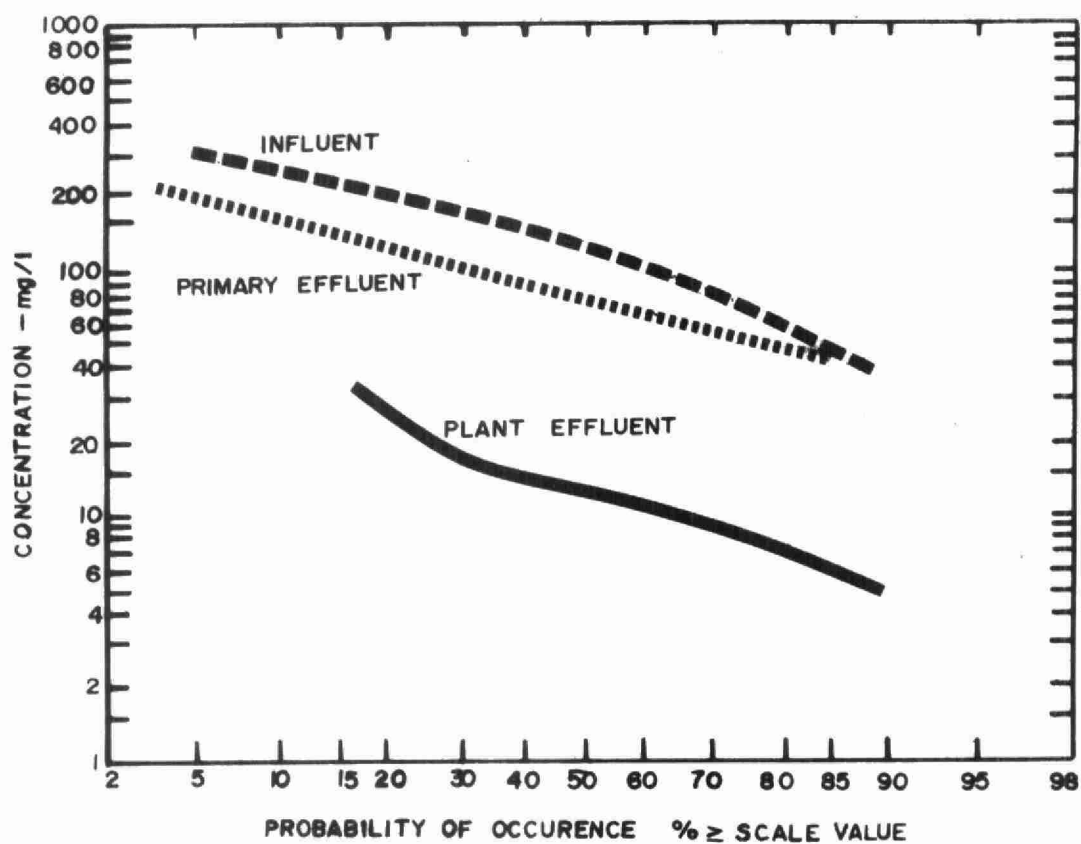


## **FL O W S**

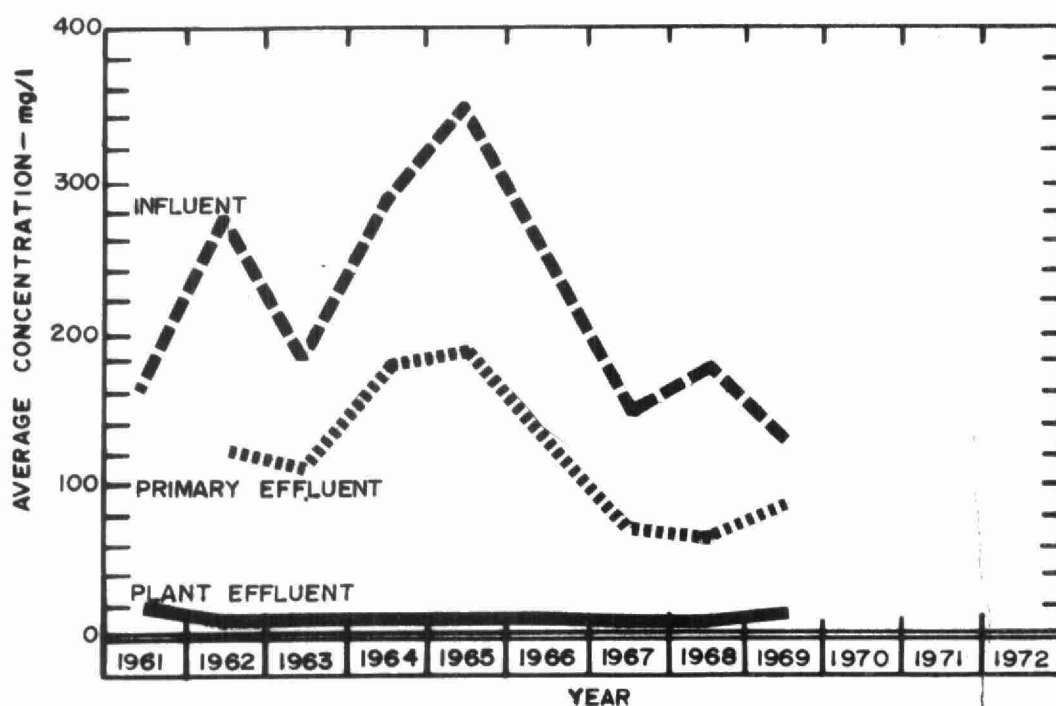


## PLANT FLOWS and CHLORINATION

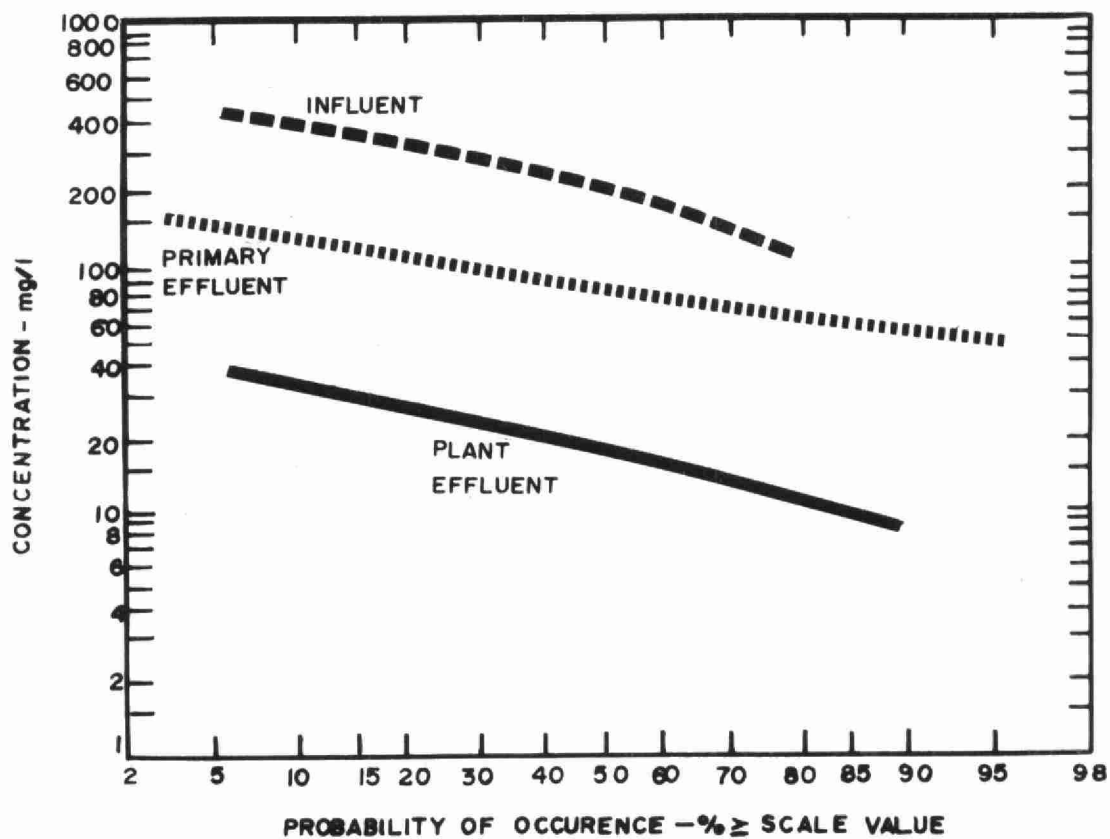
MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED 10 <sup>2</sup> pounds	DOSAGE mg/l
JAN	21.6	.70	1.27	.44	7.39	3.4
FEB	19.3	.69	.92	.51	6.62	4.4
MAR	26.2	.85	1.39	.45	8.84	3.4
APR	32.4	1.07	1.72	.86	8.07	2.5
MAY	25.9	.83	1.07	.61	8.75	3.4
JUNE	16.3	.59	.69	.42	7.49	4.6
JULY	14.3	.46	.55	.39	8.02	5.6
AUG	14.6	.47	.63	.41	7.86	5.4
SEPT	13.1	.44	.51	.36	7.02	5.4
OCT	13.9	.45	.58	.35	6.58	4.7
NOV	20.3	.67	1.12	.48	7.30	3.6
DEC	17.5	.57	.62	.47	8.09	4.6
TOTAL	235.4	-	-	-	92.03	-
AVERAGE	-	.60	-	-	7.67	3.9



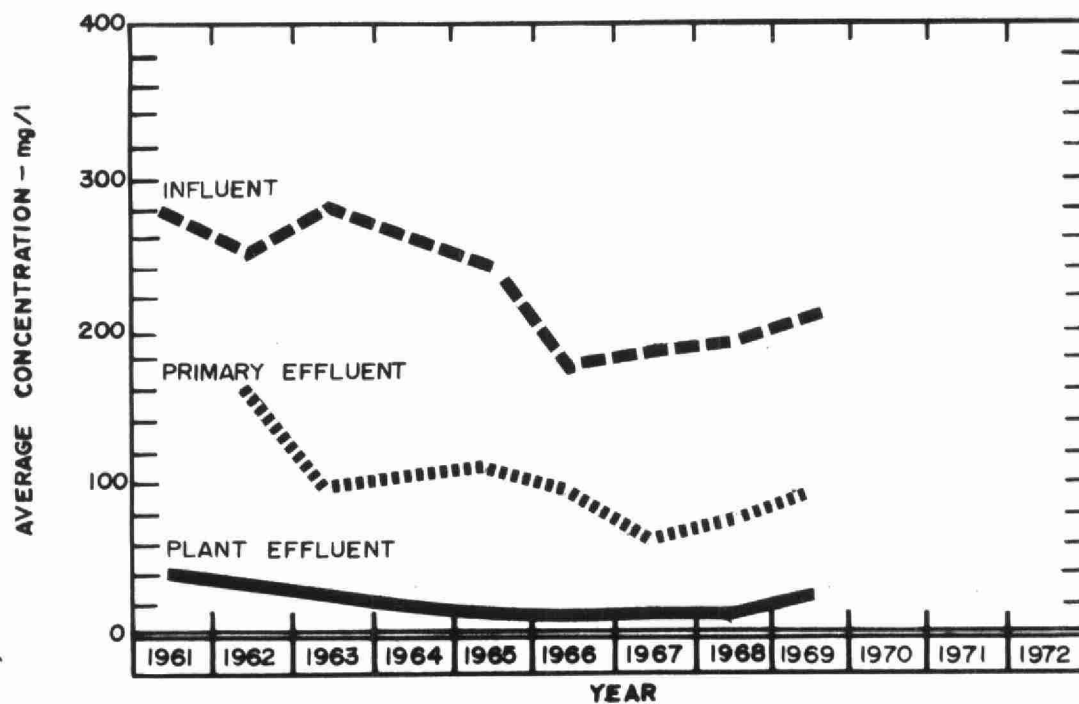
## BIOCHEMICAL OXYGEN DEMAND







## SUSPENDED SOLIDS

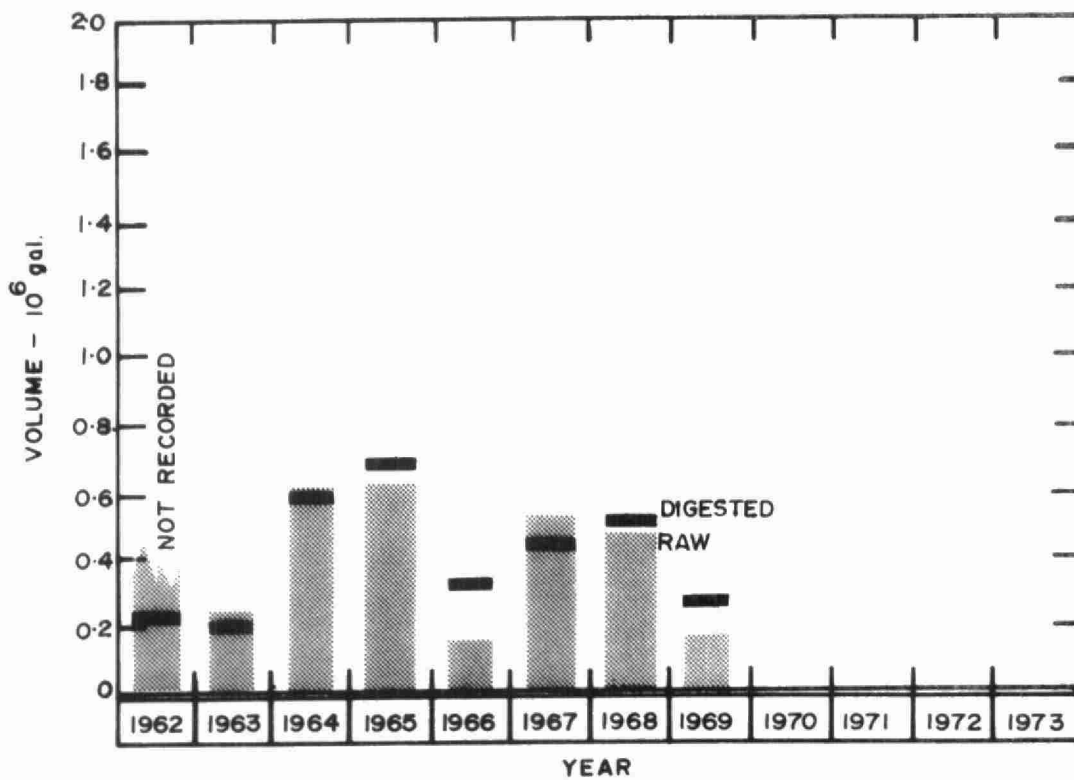


## PLANT EFFICIENCY

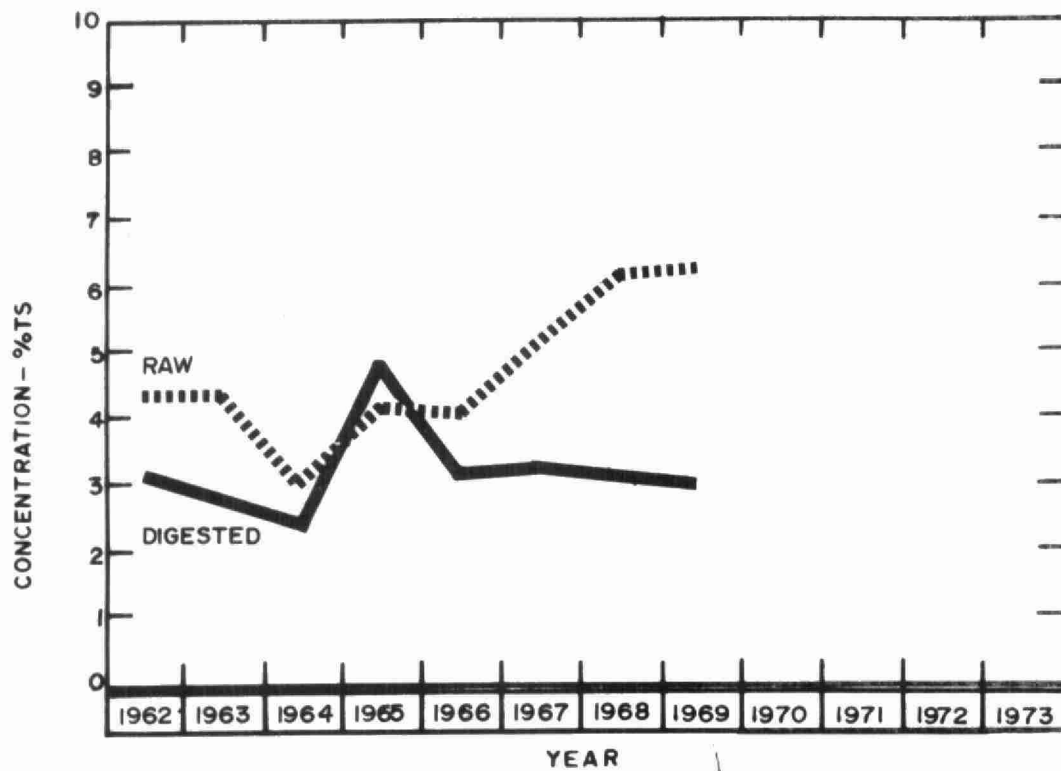
MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT REMOVAL
	INF. mg/l	EFF. mg/l	REDUCTION		INF. CONCN mg/l	EFF. CONCN mg/l	REDUCTION		
			%	10 <sup>3</sup> pounds			%	10 <sup>3</sup> pounds	cu
JAN	190	13	93	38.3	180	5	97	37.9	11
FEB	120	30	75	17.4	230	20	92	40.5	62
MAR	95	11	88	22.0	325	20	94	80.0	9
APR	59	18	69	13.2	163	23	86	45.3	6
MAY	43	5	88	9.8	90	10	89	20.7	24
JUNE	47	13	72	5.5	73	10	86	10.3	10
JULY	215	42	80	24.8	210	65	69	20.8	20
AUG	152	8	95	21.0	210	43	80	24.4	9
SEPT	156	16	90	18.4	230	26	89	26.7	9
OCT	113	9	92	14.4	225	20	91	28.5	15
NOV	149	13	91	27.6	342	15	96	66.3	14
DEC	180	26	86	27.0	220	17	92	35.6	12
TOTAL	-	-	-	-	-	-	-	-	-
AVERAGE	127	17	87	20.0	208	23	89	36.4	17

## AERATION

MONTH	AVG DAILY FLOW mil gal	AERATION INF.		SECONDY. EFF.		MLSS CONCN mg/l	F/M <div>lb BOD lb MLSS</div>	AIR USED <div>1000 cu ft lb BOD</div>	WASTE SLUDGE <div>10<sup>3</sup> pounds</div>
		BOD	SS	BOD	SS				
		mg/l	mg/l	mg/l	mg/l				
JAN	.64	100	70	13	5	3019	.15	-	6.8
FEB	.68	40	100	30	20	2820	.07	-	7.9
MAR	.67	77	100	11	20	2330	.16	-	13.1
APR	.80	48	65	18	23	3300	.08	-	15.0
MAY	.76	50	90	5	10	3220	.09	-	5.1
JUNE	.59	66	95	13	10	2850	.10	-	5.2
JULY	.46	160	125	42	65	2910	.18	-	3.4
AUG	.43	100	130	8	43	2770	.12	-	3.7
SEPT	.44	74	73	16	26	2490	.09	-	4.6
OCT	.45	96	101	9	20	2660	.12	-	3.9
NOV	.65	85	103	13	15	3180	.13	-	7.3
DEC	.57	126	100	26	17	2840	.18	-	7.9
TOTAL	-	-	-	-	-	-	-	-	-
AVERAGE	.60	85	96	17	23	2870	.12	-	6.9



## DIGESTION



## SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SLUDGE DISPOSAL	
	VOLUME	TOTAL SOLIDS	VOL SOLIDS	VOLUME	TOTAL SOLIDS	VOL SOLIDS	DEWATERED	LIQUID
	10 <sup>3</sup> gal	%	%	10 <sup>3</sup> gal	%	%	cu yd	cu yd
JAN	32.8	5.5	76	40.4	-	-	0	240
FEB	36.2	6.8	68	32.8	-	-	0	195
MAR	46.3	6.5	70	50.5	3.0	57	0	300
APR	31.6	-	-	32.9	-	-	0	780
MAY	26.1	-	-	106.1	-	-	0	630
JUNE	-	-	-	0	-	-	0	338*
JULY	-	-	-	0	-	-	0	405*
AUG	-	-	-	0	-	-	0	413*
SEPT	-	-	-	0	-	-	0	421*
OCT	-	-	-	0	-	-	0	410*
NOV	-	-	-	0	-	-	0	324*
DEC	-	-	-	0	-	-	0	419*
TOTAL	173.0	-	-	262.7	-	-	0	4875
AVERAGE	34.6	6.3	71	52.5	3.0	57	0	406

\* Raw sludge

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